

## REMARKS

Applicant wishes to thank Examiner Steadman for the courtesy and assistance extended on behalf of Applicant during a telephone interview conducted with the undersigned on May 24, 2005.

In the Office Action dated October 28, 2004, claims 1-6 and 9-12 are pending and under consideration. Claims 1-6 and 9-12 are rejected under 35 U.S.C. §112, second paragraph, as allegedly indefinite. Claims 1-6 and 9-12 are rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the written description requirement.

This Response addresses each of the Examiner's rejections. Applicant therefore respectfully submits that the present application is in condition for allowance. Favorable consideration of all pending claims is therefore respectfully requested.

Claims 1-6 and 9-12 are rejected under 35 U.S.C. §112, second paragraph, as allegedly indefinite.

Specifically, the Examiner states that the recitation "*Caulobacter crescentus* S-layer protein" in claim 1 and "an S-layer protein of said *Caulobacter crescentus*" in claim 9 are indefinite. According to the Examiner, it is unclear as to how one skilled in the art distinguishes a "*Caulobacter crescentus* S-layer protein" from any other S-layer proteins. Further, the Examiner requests the applicant to clarify whether the terms should be interpreted as S-layer proteins isolated from *Caulobacter crescentus*.

Applicant respectfully submits that the terms mean, literally, S-layer proteins isolated from *Caulobacter crescentus* including variants of *Caulobacter crescentus* S-layer proteins. In view of the foregoing, it is respectfully submitted that the present claims are not indefinite.

Withdrawal of the rejection under 35 U.S.C. §112, second paragraph, is therefore respectfully requested.

Claims 1-6 and 9-12 are rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the written description requirement.

The Examiner maintains that the specification fails to provide any characteristics of a *C. crescentus* S-layer protein fragment that includes a secretion signal such that one skilled in the art would be able to distinguish such a protein fragment from any other S-layer protein fragment containing a secretion signal. Further, the Examiner contends that the genus of *C. crescentus* S-layer protein fragments is only presently characterized by functional features. According to the Examiner, there is no disclosed correlation between the structure of a *C. crescentus* S-layer protein fragment and the function as a secretion signal; and the claims do not require any structural features.

Moreover, the Examiner acknowledges that the claims are drawn to methods, not to *C. crescentus* S-layer protein fragments which are the subject matter of U.S. Patent 6,210,948. The Examiner argues, however, that each patent application is examined on its own merits, and that the *C. crescentus* S-layer protein fragments recited in the instant claims are not as limited as those recited in the '948 patent. Furthermore, the Examiner contends that the written description rejection is consistent with Regents of the University of California v. Eli Lilly, 119 F.3d 1559, 1568, 43 USPQ2d 1398 (Fed. Cir. 1997), which held that a functional description of the genus failed to define the structural features common to all members of the genus.

Applicant reasserts that the recited S-layer proteins are not any *Caulobacter* S-layer proteins, but are S-layer proteins from *Caulobacter crescentus*. Applicant should not be required

to characterize features of the larger genus, i.e., S-layer proteins from non-*Caulobacter crescentus*.

Furthermore, Applicant respectfully submits that S-layer protein fragments from *Caulobacter crescentus* that include a secretion signal have been disclosed and claimed in U.S. Patent 6,210,948, which corresponds to WO 97/34000, published on September 18, 1997. Clearly, the '948 patent clearly teaches characteristics of a *C. crescentus* S-layer protein fragment that includes a secretion signal, and teaches those skilled in the art how to make and use such a fragment for recombinant expression of a heterologous protein. Applicant should not be required to describe additional species with respect to a claim element that is already taught in the art.

In an effort to favorably advance prosecution of the present application, Applicant has amended the claims to characterize, structurally, the *C. crescentus* S-layer protein fragment to include the C-terminal 120 amino acids of the *C. crescentus* S-layer protein, similar to the claim language of the '948 patent. Support for this amendment is found in the specification, in particular, in four fragments (amino acids 622-1026, 690-1026, 784-1026, 892-1026 and 907-1026) of SEQ ID NO: 5, all of which include the C-terminal 120 amino acids of the S-layer protein represented by SEQ ID NO: 5.

Applicant respectfully submits that a principal feature of the present application resides in the recognition that an insoluble fusion protein can be cleaved in an acid solution, yet the S-layer protein fragment remains insoluble after cleavage thereby permitting convenient separation of the heterologous protein from the insoluble S-layer protein fragment. Given the benefit of the present disclosure and the information available to those skilled in the art, those skilled in the art would consider that the successful results demonstrated with the examples of *Caulobacter crescentus* S-layer protein fragments would be readily applicable to other

*Caulobacter crescentus* S-layer protein fragments that include a secretion signal. Contrary to the Examiner's allegation, Applicant's examples of *Caulobacter crescentus* S-layer protein fragments, provided in the specification, not only address the enablement issue raised in the prior Action, but also address the written description requirement, because these examples would be considered by those skilled in the art to be representative *for the purpose of practicing the claimed methods*.

Applicant reasserts that the facts of this case are distinguished from those before the Eli Lilly Court. In Eli Lilly, a rat insulin cDNA was held to be an insufficient description of the genus of mammalian insulin cDNAs. In contrast to Eli Lilly where characteristics of a mammalian insulin cDNA other than the rat cDNA were not disclosed in the specification or the art, the present case is directed towards application of a new recognition (i.e., cleaving insoluble fusion proteins under acidic conditions) to elements known in the art (i.e., *Caulobacter crescentus* S-layer protein fragments containing a secretion signal).

In view of the foregoing, it is respectfully submitted that the subject matter of claims 1-6 and 9-12, as presently amended, is adequately described in the specification. The written description rejection of these claims under 35 U.S.C. §112, first paragraph, is overcome. Withdrawal of the rejection is respectfully requested.

In view of the foregoing amendments and remarks, it is firmly believed that the subject application is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Xiaochun Zhu', with a stylized, flowing script.

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